(d)

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-012377
(43)Date of publication of application : 16.01.1998

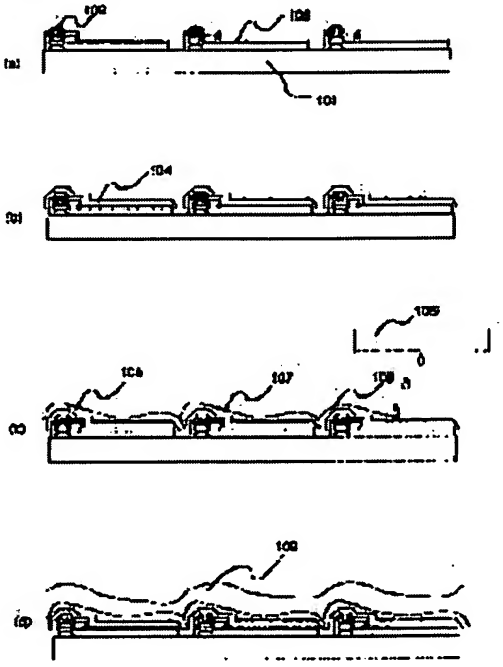
(51)Int.Cl. H05B 33/10
B41J 2/01

(21)Application number : 08-158671
(22)Date of filing : 19.06.1996

(71)Applicant : SEIKO EPSON CORP
(72)Inventor : SHIMODA TATSUYA
MIYASHITA SATORU
KIGUCHI HIROSHI

(54) MANUFACTURE OF ACTIVE MATRIX TYPE ORGANIC EL DISPLAY BODY

(57)Abstract:
PROBLEM TO BE SOLVED: To manufacture an active matrix type organic EL display body at low cost by pattern-applying organic light emitting materials of red, green and blue on a base having a thin film transistor by means of ink jet.
SOLUTION: On a glass base 101, an ITO transparent picture element electrode 103 is formed after a thin film transistor 102 is formed thereon. A positive hole injection layer 104 of polyphenylene vinylene or the like is further formed thereon. This positive hole injection layer 104 is obtained by applying polytetrahydrothiophenyl phenylene of precursor followed by heating and polymerization. Organic light emitting layers 106-108 of red, green and blue are formed thereon every picture element. The organic light emitting layers are color- arranged and formed according to the pattern of each color every picture element by an ink jet printer 105. Further, A reflecting electrode 109 such as Mg, Ag or the like is formed thereon by evaporation.



LEGAL STATUS

[Date of request for examination] 29.10.1999

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]	
[Patent number]	3036436
[Date of registration]	25.02.2000
[Number of appeal against examiner's decision of rejection]	
[Date of requesting appeal against examiner's decision of rejection]	
[Date of extinction of right]	

JAPANESE [JP,10-012377,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS CORRECTION or AMENDMENT

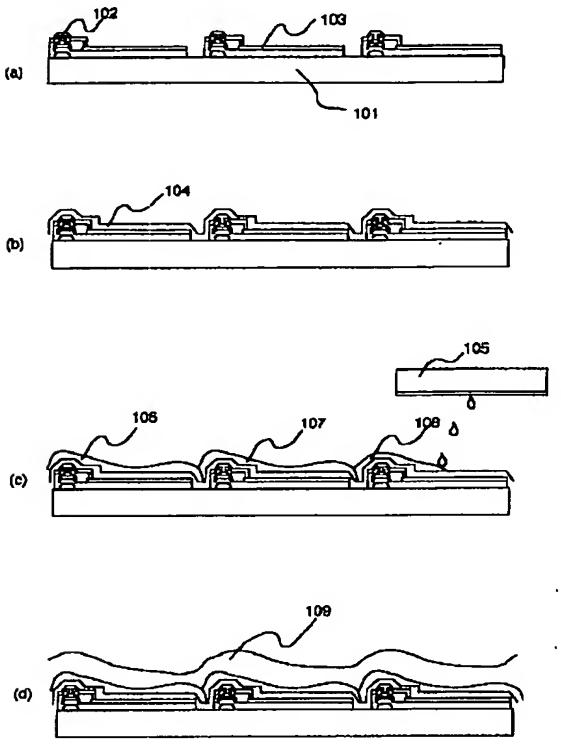
[Translation done.]

CLAIMS

[Claim(s)]
[Claim 1] A hole-injection layer is formed in the transparent pixel electrode upper layer formed in the glass substrate which has TFT. In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color besides chosen as the layer from red, green, and blue for every pixel at least is formed, and a reflector is further formed in this upper layer The manufacture method of the active matrix type organic EL display object characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method.
[Claim 2] The manufacture method of the active matrix type organic EL display object characterized by to make formation and the array of the aforementioned organic luminous layer by the ink-jet method in the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from red, green, and blue as the transparent pixel electrode upper layer formed in the glass substrate which has TFT for every pixel at least is formed, and a reflector is further formed in this upper layer.
[Claim 3] In the reflective pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, a hole-injection layer is formed in this upper layer, and a transparent electrode is further formed in this upper layer The manufacture method of the active matrix type organic EL display object characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method.
[Claim 4] The manufacture method of the active matrix type organic EL display object characterized by to be made formation and the array of the aforementioned organic luminous layer by the ink-jet method in the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from red, green, and blue as the reflective pixel electrode upper layer formed in the glass substrate which has TFT for every pixel at least is formed, and a transparent electrode is further formed in this upper layer.

[Translation done.]

Drawing selection [Representative drawing]



[Translation done.]

JAPANESE [JP,10-012377,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS CORRECTION or AMENDMENT

[Translation done.]

DETAILED DESCRIPTION

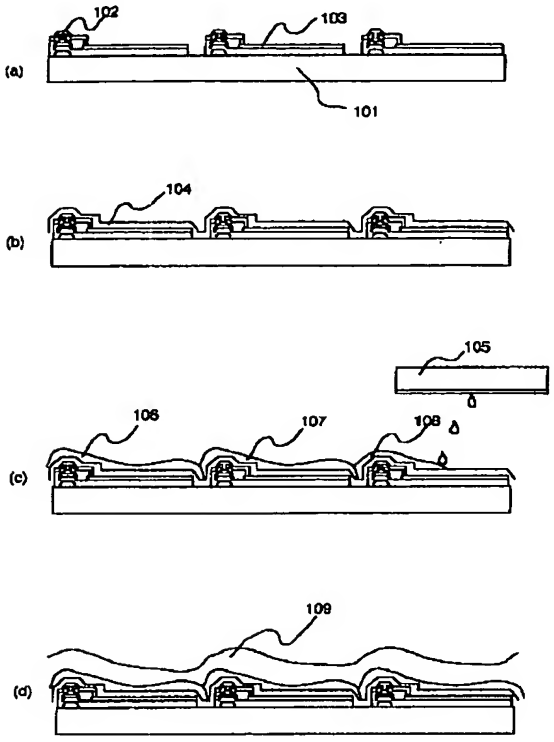
[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the manufacture method using the ink-jet method of active matrix type EL display object which used TFT.
[0002]
[Description of the Prior Art] An organic EL element is an element made to emit light using discharge (fluorescence and phosphorescence) of the light at the time of having the composition which sandwiched the thin film containing a fluorescence nature organic compound by cathode and the anode plate, making an exciton (exciton) generate by making an electron and an electron hole (hole) pour in and recombine with the aforementioned thin film, and this exciton deactivating.
[0003] The feature of this organic EL element is 100 - 100000 cd/m2 at the low battery not more than 10V. It is that field luminescence of high brightness of a grade is possible, and luminescence to blue shell red is possible by choosing the kind of fluorescent substance.
[0004] The organic EL element attracts attention as what realizes a cheap large area full color display device (an electronic-intelligence communication society technical report, the 89th volume, NO.106, 49 pages, 1989). According to the report, the organic coloring matter which emits strong fluorescence was used for the luminous layer, and bright luminescence of blue, green, and red has been obtained. this having emitted strong fluorescence by the shape of a thin film, and having used the organic coloring matter with few pinhole defects -- it is -- high -- it is thought that the brightness full color display was realizable
[0005] furthermore, the thin film layer to which the component of an organic luminous layer becomes JP,5-78655,A from the mixture of an organic charge material and an organic luminescent material -- preparing -- concentration quenching -- preventing -- the selection width of face of luminescent material -- extending -- high -- the purport used as a brightness full color element is proposed
[0006] However, reference is made by neither of the reports about the composition and the manufacture method of an actual full color display panel.
[0007]
[Problem(s) to be Solved by the Invention] The organic thin film EL element using the above-mentioned organic coloring matter shows luminescence of blue, green, and red. However, in order to realize a full color display object as known well, it is necessary to arrange the organic luminous layer which emits light in the three primary colors for every pixel. Conventionally, technology which carries out patterning of the organic luminous layer was made very difficult. A cause is the point that the surface of metal of one of reflector material is unstable, and the patterning precision of vacuum evaporationo does not come out. The 2nd is the point that polymer or the precursor which form a hole-injection layer and an organic luminous layer do not have resistance to patterning processes, such as photo lithography.

[0008] this invention solves a technical problem which was mentioned above, and the purpose is in offering the manufacture method of the active matrix type EL display object which carried out patterning of the organic luminous layer for every pixel with the ink-jet method.
[0009]
[Means for Solving the Problem] The manufacture method of the active matrix type organic EL display object in connection with this invention A hole-injection layer is formed in the transparent pixel electrode upper layer formed in the glass substrate which has TFT. In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color besides chosen as the layer from red, green, and blue for every pixel at least is formed, and a reflector is further formed in this upper layer It is characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method. In the transparent pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Moreover, red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, and a reflector is further formed in this upper layer, it is characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method.
[0010] In the reflective pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Furthermore, red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, a hole-injection layer is formed in this upper layer, and a transparent electrode is further formed in this upper layer It is characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method. In the reflective pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Moreover, red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, and a transparent electrode is further formed in this upper layer, it is characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method.
[0011] As shown in drawing 3 in short, on the signal line 301 formed on the substrate, the gate line 302, the pixel electrode 303, and TFT 304, by the ink-jet method, this invention is carrying out the patterning application of red and the organic green and blue luminescent material, and realizes a full color display.
[0012]
[Embodiments of the Invention] Hereafter, the suitable operation gestalt of this invention is explained with reference to a drawing.
[0013] (Example 1) As shown in drawing 1 , after forming TFT 102 on a glass substrate 101, the ITO transparent pixel electrode 103 is formed.
[0014] The polytetrahydro thiophenyl phenylene which is a polymer precursor as a hole-injection material is coated. Of heating, a precursor serves as a polyphenylene vinylene and the hole-injection layer 104 with a thickness of 0.05 microns is formed.
[0015] Next, the patterning application of the luminescent material which colors red, green, and blue with ink-jet print equipment 105 is carried out, and the coloring layers 106, 107, and 108 with a thickness of 0.05 microns are formed. A polyphenylene vinylene is used for a cyano polyphenylene vinylene and green luminescent material, and a polyphenylene vinylene and the poly alkyl phenylene are used for blue luminescent material at red luminescent material. It is the Cambridge Display Technologies make, and such organic EL material is liquefied and available.
[0016] Finally, the MgAg reflector 109 with a thickness of 0.1-0.2 microns is formed by the vacuum deposition.
[0017] Thereby, the full color organic EL display object of a direct viewing type is completed.
[0018] (Example 2) As shown in drawing 2 , after forming TFT 202 on a glass substrate 201, the

AlLi reflective pixel electrode 203 is formed.
[0019] Next, the patterning application of the luminescent material which colors red, green, and blue with ink-jet print equipment 207 is carried out, and the coloring layers 204, 205, and 206 are formed. A polyphenylene vinylene is used for a cyano polyphenylene vinylene and green luminescent material, and a polyphenylene vinylene and the poly alkyl phenylene are used for blue luminescent material at red luminescent material. It is the Cambridge Display Technologies make, and such organic EL material is liquefied and available.
[0020] The polytetrahydro thiophenyl phenylene which is a polymer precursor as a hole-injection material is formed by the cast method. Of heating, a precursor serves as a polyphenylene vinylene and the hole-injection layer 208 is formed.
[0021] Finally, the ITO transparent electrode 209 is formed by the vacuum deposition.
[0022] Thereby, a reflected type full color organic EL display object is completed.
[0023] (Example 3) as an organic luminescent material of an organic luminous layer -- 2, 3, 6, 7-tetrahydro-11-oxo-1H, and 5H and 11H -- it considers as a green luminescent material by mixing both using a -(1) benzo PIRANO [6, 7, 8-ij]-kino lysine-10-carboxylic acid, using a 1 and 1-screw-(4-N and N-ditolylamino phenyl) cyclohexane as an organic hole-injection layer material
[0024] Similarly, they are 2-13' and a 4'-dihydroxy phenyl as an organic red luminescent material. - It mixes with hole-injection layer material using 3, 5, and 7-trihydroxy-1-benzo pyrylium perchlorate.
[0025] Furthermore, tris (8-hydroxy quinolinol) aluminum is used for a blue luminous layer as an organic hole-injection material, and it is 2, 3, 6, and 7-tetrahydro-9-methyl-11-oxo as an organic luminescent material. -A 1H, 5H, and 11H-(1) benzo PIRANO [6, 7, 8-ij]-kino lysine is mixed, and luminescent material is created.
[0026] At the same process as an example 1 or an example 2, partial patterning of each luminous layer is carried out with ink jet printer equipment, and an active matrix type organic EL display object is created.
[0027] Besides organic EL material used by this example, in addition, an aroma tick diamine derivative (TDP), An oxy-diazole dimer (OXD), an oxy-diazole derivative (PBD), A JISUCHIRU arylene derivative (DSA), a quinolinol system metal complex, a beryllium-benzo quinolinol complex (Bebq), A triphenylamine derivative (MTDATA), a JISUCHIRIRU derivative, a pyrazoline dimer, Although rubrene, a Quinacridone, a triazole derivative, a polyphenylene, the poly alkyl fluorene, the poly alkyl thiophene, an azomethine zinc complex, a porphyrin zinc complex, a benzo oxazole zinc complex, and a phenanthroline europium complex can be used It is not the object restricted to this.
[0028]
[Effect of the Invention] Patterning became possible in forming and arranging organic EL material it was presupposed that patterning was impossible of material conventionally with an ink-jet method, and the active matrix type organic EL display object of a full color display was realized. Manufacture of the full color display object of a big screen is attained [that it is cheap and] by this, and an effect is size.

[Translation done.]

Drawing selection [Repr s ntative drawing]



[Translation done.]

JAPANESE [JP,10-012377,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS CORRECTION or AMENDMENT

[Translation done.]

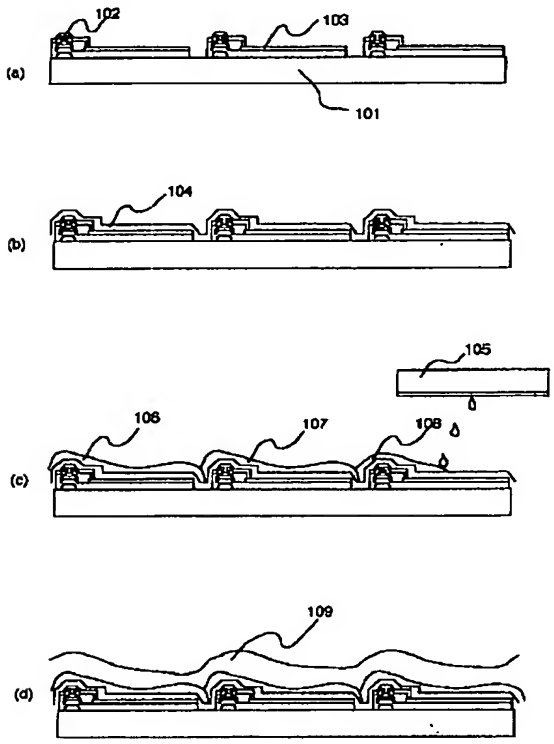
* NOTICES *

TECHNICAL FIELD

[The technical field to which invention belongs] this invention relates to the manufacture method using the ink-jet method of active matrix type EL display object which used TFT.

[Translation done.]

Drawing selection [Repres ntative drawing]



[Translation done.]

JAPANESE [JP,10-012377,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS CORRECTION or AMENDMENT

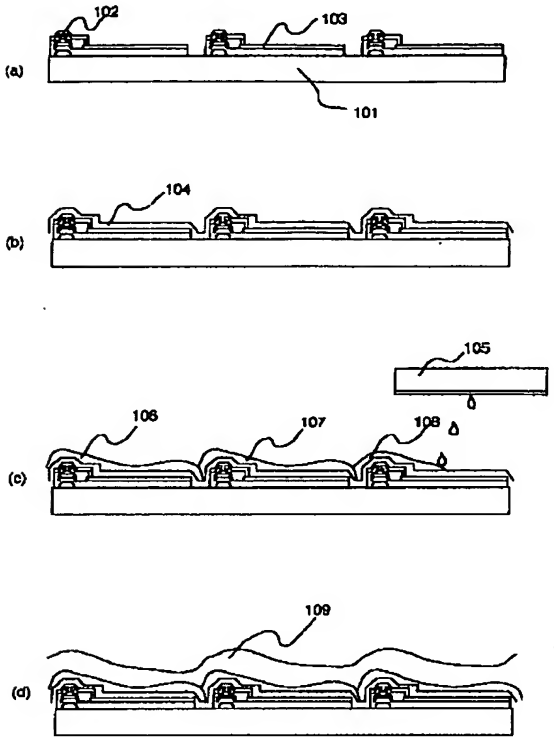
[Translation done.]

PRIOR ART

[Description of the Prior Art] An organic EL element is an element made to emit light using discharge (fluorescence and phosphorescence) of the light at the time of having the composition which sandwiched the thin film containing a fluorescence nature organic compound by cathode and the anode plate, making an exciton (exciton) generate by making an electron and an electron hole (hole) pour in and recombine with the aforementioned thin film, and this exciton deactivating.
[0003] The feature of this organic EL element is 100 - 100000 cd/m2 at the low battery not more than 10V. It is that field luminescence of high brightness of a grade is possible, and luminescence to blue shell red is possible by choosing the kind of fluorescent substance.
[0004] The organic EL element attracts attention as what realizes a cheap large area full color display device (an electronic-intelligence communication society technical report, the 89th volume, NO.106, 49 pages, 1989). According to the report, the organic coloring matter which emits strong fluorescence was used for the luminous layer, and bright luminescence of blue, green, and red has been obtained. this having emitted strong fluorescence by the shape of a thin film, and having used the organic coloring matter with few pinhole defects -- it is -- high -- it is thought that the brightness full color display was realizable
[0005] furthermore, the thin film layer to which the component of an organic luminous layer becomes JP,5-78655,A from the mixture of an organic charge material and an organic luminescent material -- preparing -- concentration quenching -- preventing -- the selection width of face of luminescent material -- extending -- high -- the purport used as a brightness full color element is proposed
[0006] However, reference is made by neither of the reports about the composition and the manufacture method of an actual full color display panel.

[Translation done.]

Drawing selection [Representativ drawing]



[Translation done.]

JAPANESE [JP,10-012377,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS CORRECTION or AMENDMENT

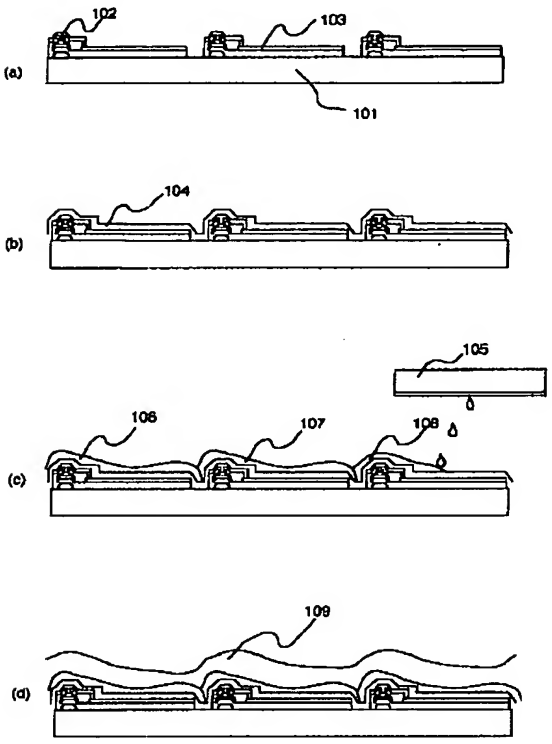
[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention] Patterning became possible in forming and arranging organic EL material it was presupposed that patterning was impossible of material conventionally with an ink-jet method, and the active matrix type organic EL display object of a full color display was realized. Manufacture of the full color display object of a big screen is attained [that it is cheap and] by this, and an effect is size.

[Translation done.]

Drawing selection [Repr sentativ drawing]



[Translation done.]

JAPANESE [JP,10-012377,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS CORRECTION or AMENDMENT

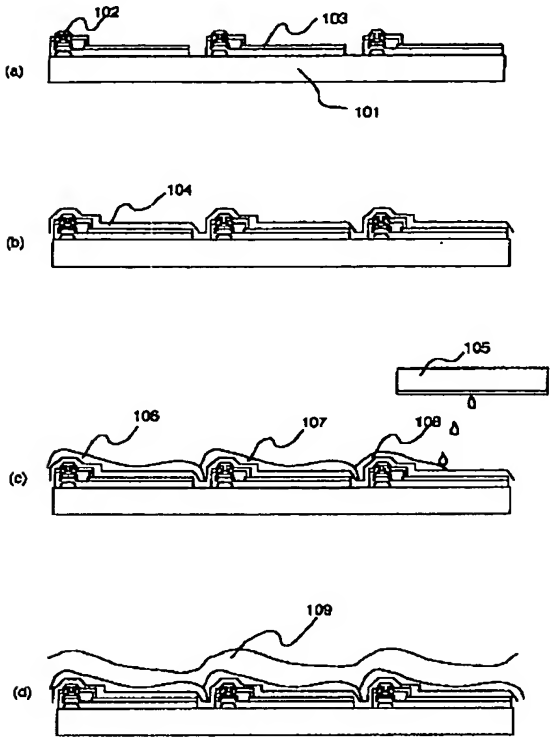
[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] The organic thin film EL element using the above-mentioned organic coloring matter shows luminescence of blue, green, and red. However, in order to realize a full color display object as known well, it is necessary to arrange the organic luminous layer which emits light in the three primary colors for every pixel. Conventionally, technology which carries out patterning of the organic luminous layer was made very difficult. A cause is the point that the surface of metal of one of reflector material is unstable, and the patterning precision of vacuum evaporationo does not come out. The 2nd is the point that polymer or the precursor which form a hole-injection layer and an organic luminous layer do not have resistance to patterning processes, such as photo lithography. [0008] this invention solves a technical problem which was mentioned above, and the purpose is in offering the manufacture method of the active matrix type EL display object which carried out patterning of the organic luminous layer for every pixel with the ink-jet method.

[Translation done.]

Drawing selection [R pr s ntativ drawing]



[Translation done.]

JAPANESE [JP,10-012377,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS CORRECTION or AMENDMENT

[Translation done.]

* NOTICES *

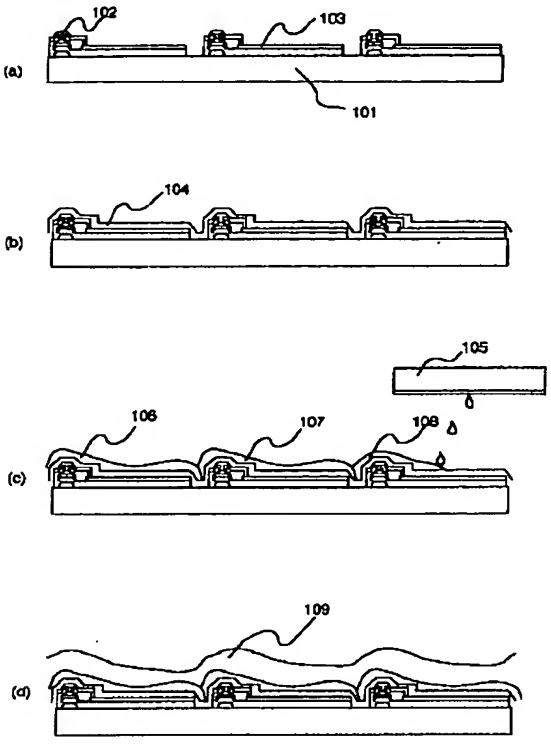
MEANS

[Means for Solving the Problem] The manufacture method of the active matrix type organic EL display object in connection with this invention A hole-injection layer is formed in the transparent pixel electrode upper layer formed in the glass substrate which has TFT. In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color besides chosen as the layer from red, green, and blue for every pixel at least is formed, and a reflector is further formed in this upper layer It is characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method. In the transparent pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Moreover, red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, and a reflector is further formed in this upper layer, it is characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method.
[0010] In the reflective pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Furthermore, red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, a hole-injection layer is formed in this upper layer, and a transparent electrode is further formed in this upper layer It is characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method. In the reflective pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Moreover, red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, and a transparent electrode is further formed in this upper layer, it is characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method.
[0011] As shown in drawing 3 in short, on the signal line 301 formed on the substrate, the gate line 302, the pixel electrode 303, and TFT 304, by the ink-jet method, this invention is carrying out the patterning application of red and the organic green and blue luminescent material, and realizes a full color display.
[0012]
[Embodiments of the Invention] Hereafter, the suitable operation gestalt of this invention is explained with reference to a drawing.
[0013] (Example 1) As shown in drawing 1 , after forming TFT 102 on a glass substrate 101, the ITO transparent pixel electrode 103 is formed.
[0014] The polytetrahydro thiophenyl phenylene which is a polymer precursor as a hole-injection material is coated. Of heating, a precursor serves as a polyphenylene vinylene and the hole-injection layer 104 with a thickness of 0.05 microns is formed.
[0015] Next, the patterning application of the luminescent material which colors red, green, and

blue with ink-jet print equipment 105 is carried out, and the coloring layers 106, 107, and 108 with a thickness of 0.05 microns are formed. A polyphenylene vinylene is used for a cyano polyphenylene vinylene and green luminescent material, and a polyphenylene vinylene and the poly alkyl phenylene are used for blue luminescent material at red luminescent material. It is the Cambridge Display Technologies make, and such organic EL material is liquefied and available.
[0016] Finally, the MgAg reflector 109 with a thickness of 0.1-0.2 microns is formed by the vacuum deposition.
[0017] Thereby, the full color organic EL display object of a direct viewing type is completed.
[0018] (Example 2) As shown in drawing 2 , after forming TFT 202 on a glass substrate 201, the AlLi reflective pixel electrode 203 is formed.
[0019] Next, the patterning application of the luminescent material which colors red, green, and blue with ink-jet print equipment 207 is carried out, and the coloring layers 204, 205, and 206 are formed. A polyphenylene vinylene is used for a cyano polyphenylene vinylene and green luminescent material, and a polyphenylene vinylene and the poly alkyl phenylene are used for blue luminescent material at red luminescent material. It is the Cambridge Display Technologies make, and such organic EL material is liquefied and available.
[0020] The polytetrahydro thiophenyl phenylene which is a polymer precursor as a hole-injection material is formed by the cast method. Of heating, a precursor serves as a polyphenylene vinylene and the hole-injection layer 208 is formed.
[0021] Finally, the ITO transparent electrode 209 is formed by the vacuum deposition.
[0022] Thereby, a reflected type full color organic EL display object is completed.
[0023] (Example 3) as an organic luminescent material of an organic luminous layer -- 2, 3, 6, 7-tetrahydro-11-oxo-1H, and 5H and 11H -- it considers as a green luminescent material by mixing both using a -(1) benzo PIRANO [6, 7, 8-ij]-kino lysine-10-carboxylic acid, using a 1 and 1-screw-(4-N and N-ditolylamino phenyl) cyclohexane as an organic hole-injection layer material
[0024] Similarly, they are 2-13' and a 4'-dihydroxy phenyl as an organic red luminescent material. - It mixes with hole-injection layer material using 3, 5, and 7-trihydroxy-1-benzo pyrylium perchlorate.
[0025] Furthermore, tris (8-hydroxy quinolinol) aluminum is used for a blue luminous layer as an organic hole-injection material, and it is 2, 3, 6, and 7-tetrahydro-9-methyl-11-oxo as an organic luminescent material. -A 1H, 5H, and 11H-(1) benzo PIRANO [6, 7, 8-ij]-kino lysine is mixed, and luminescent material is created.
[0026] At the same process as an example 1 or an example 2, partial patterning of each luminous layer is carried out with ink jet printer equipment, and an active matrix type organic EL display object is created.
[0027] Besides organic EL material used by this example, in addition, an aroma tick diamine derivative (TDP), An oxy-diazole dimer (OXD), an oxy-diazole derivative (PBD), A JISUCHIRU arylene derivative (DSA), a quinolinol system metal complex, a beryllium-benzo quinolinol complex (Bebq), A triphenylamine derivative (MTDATA), a JISUCHIRIRU derivative, a pyrazoline dimer, Although rubrene, a Quinacridone, a triazole derivative, a polyphenylene, the poly alkyl fluorene, the poly alkyl thiophene, an azomethine zinc complex, a porphyrin zinc complex, a benzo oxazole zinc complex, and a phenanthroline europium complex can be used It is not the object restricted to this.

[Translation done.]

Drawing selection [Repres ntative drawing]



[Translation done.]

JAPANESE [JP,10-012377,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS CORRECTION or AMENDMENT

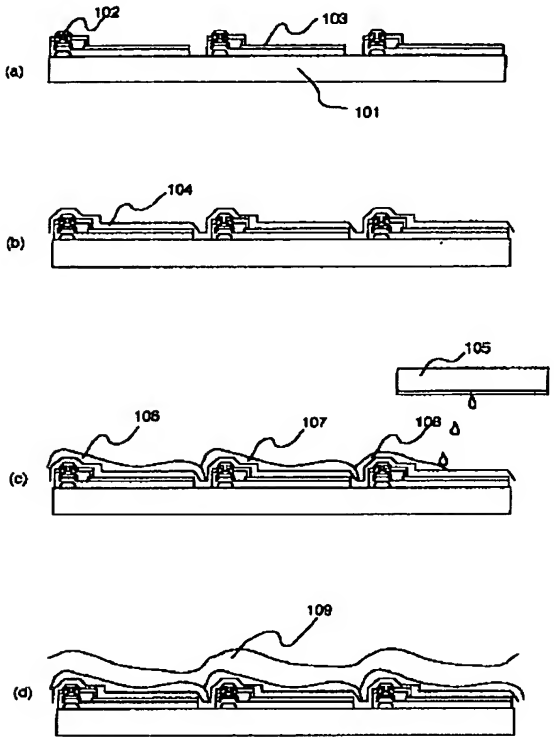
[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing showing the process of the active matrix type organic EL display object in the 1st operation gestalt of this invention.
[Drawing 2] It is drawing showing the process of the active matrix type organic EL display object in the 2nd operation gestalt of this invention.
[Drawing 3] It is drawing showing the coloring layer formed by the ink-jet method on the TFT of this invention.
[Description of Notations]
101 Glass Substrate
102 TFT
103 Transparent Pixel Electrode
104 Hole-Injection Layer
105 Ink Jet Printer Head
106 Organic Luminous Layer (1st Color)
107 Organic Luminous Layer (2nd Color)
108 Organic Luminous Layer (3rd Color)
109 Reflector
201 Glass Substrate
202 TFT
203 Reflective Pixel Electrode
204 Organic Luminous Layer (1st Color)
205 Organic Luminous Layer (2nd Color)
206 Organic Luminous Layer (3rd Color)
207 Ink Jet Printer Head
208 Hole-Injection Layer
209 Transparent Electrode
301 Signal Line
302 Gate Line
303 Pixel Electrode
304 TFT
305 Organic Luminous Layer (1st Color)
306 Organic Luminous Layer (2nd Color)
307 Organic Luminous Layer (3rd Color)

[Translation done.]

Drawing selection [R presentativ drawing]



[Translation done.]

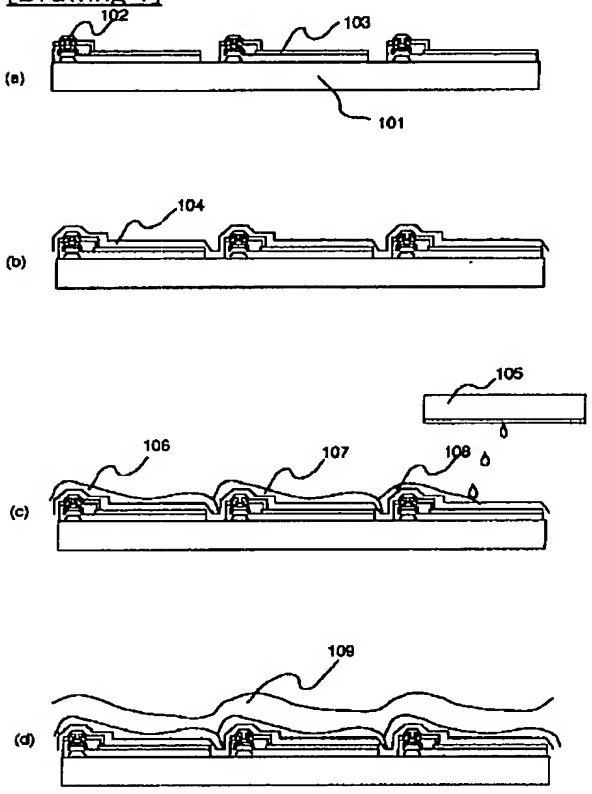
JAPANESE [JP,10-012377,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS CORRECTION or AMENDMENT

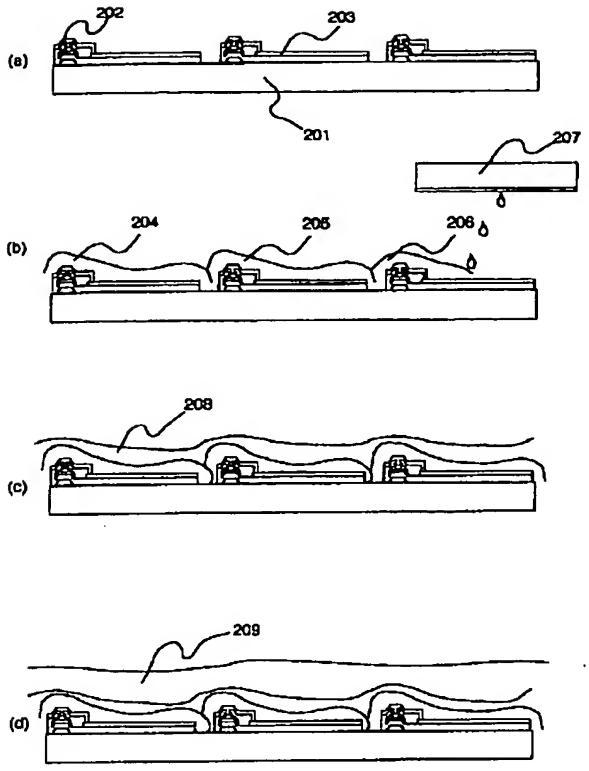
[Translation done.]

DRAWINGS

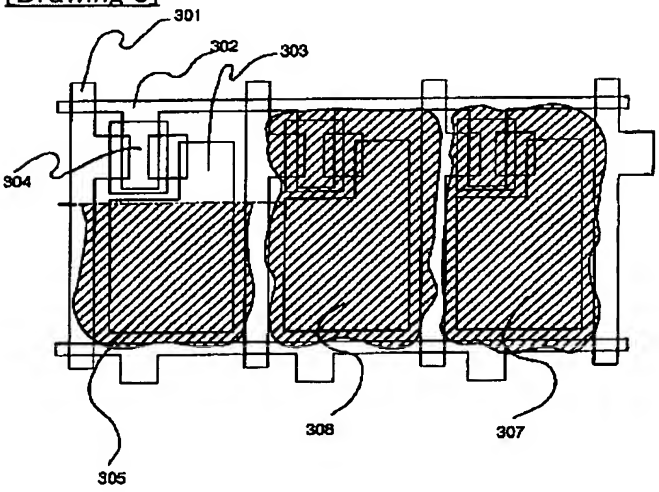
[Drawing 1]



[Drawing 2]

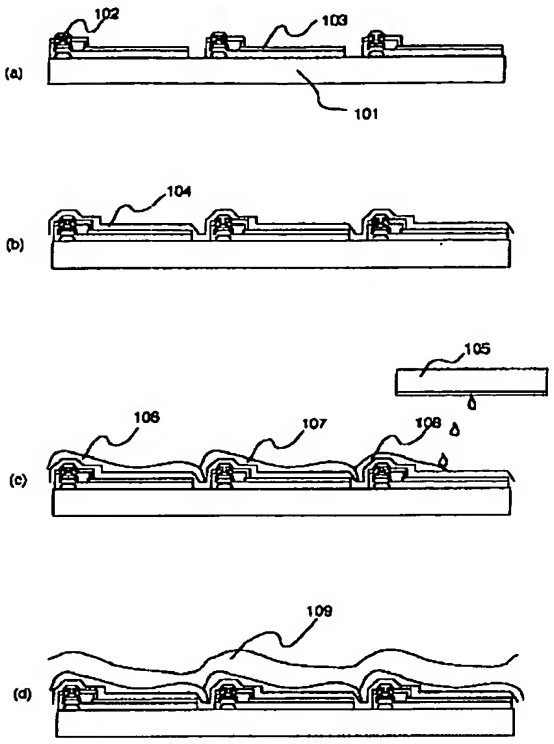


[Drawing 3]



[Translation done.]

Drawing selection [Representativ drawing]



[Translation done.]

Back t original [JP,10-012377,A]

[Translation done.]

1. Amendment March 16, Heisei 13 (2001)

[Translation done.]

CORRECTION or AMENDMENT

[Official Gazette Type] Printing of amendment by the convention of 2 of Article 17 of patent law

[Section partition] The 1st partition of the 7th section
[Date of issue] March 16, Heisei 13 (2001. 3.16)

[Publication No.] JP,10-12377,A
[Date of Publication] January 16, Heisei 10 (1998. 1.16)
[**** format] Open patent official report 10-124
[Filing Number] Japanese Patent Application No. 8-158671
[The 7th edition of International Patent Classification]

H05B 33/10
B41J 2/01

[FI]

H05B 33/10
B41J 3/04 101 Z

[Procedure revision]
[Filing Date] October 29, Heisei 11 (1999. 10.29)
[Procedure amendment 1]
[Document to be Amended] Specification
[Item(s) to be Amended] Claim
[Method of Amendment] Change
[Proposed Amendment]
[Claim(s)]
[Claim 1] A hole-injection layer is formed in the transparent pixel electrode upper layer formed in the glass substrate which has TFT. In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color besides chosen as the layer from red, green, and blue for every pixel at least is formed, and a reflector is further formed in this upper layer The manufacture method of the active matrix type organic EL display object characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method.
[Claim 2] The manufacture method of the active matrix type organic EL display object characterized by to make formation and the array of the aforementioned organic luminous layer by the ink-jet method in the manufacture method of an active matrix type organic EL display

object that the organic luminous layer which has the luminescent color chosen from red, green, and blue as the transparent pixel electrode upper layer formed in the glass substrate which has TFT for every pixel at least is formed, and a reflector is further formed in this upper layer.
[Claim 3] In the reflective pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, a hole-injection layer is formed in this upper layer, and a transparent electrode is further formed in this upper layer The manufacture method of the active matrix type organic EL display object characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method.
[Claim 4] The manufacture method of the active matrix type organic EL display object characterized by to be made formation and the array of the aforementioned organic luminous layer by the ink-jet method in the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from red, green, and blue as the reflective pixel electrode upper layer formed in the glass substrate which has TFT for every pixel at least is formed, and a transparent electrode is further formed in this upper layer.
[Claim 5] The manufacture method of the active matrix type organic EL display object according to claim 1 to 4 which supplies polymer or its precursor by the aforementioned ink-jet method, and forms the aforementioned organic luminous layer.
[Claim 6] The manufacture method of the active matrix type organic EL display object according to claim 1 to 5 which forms the aforementioned organic luminous layer which has the red luminescent color by the cyano polyphenylene vinylene.
[Claim 7] The manufacture method of the active matrix type organic EL display object according to claim 1 to 6 which forms the aforementioned organic luminous layer which has the green luminescent color by the polyphenylene vinylene.
[Claim 8] The manufacture method of the active matrix type organic EL display object according to claim 1 to 7 which forms the aforementioned organic luminous layer which has the blue luminescent color by the polyphenylene vinylene and the poly alkyl phenylene.
[Claim 9] The manufacture method of the active matrix type organic EL display object according to claim 1 to 8 which constitutes the aforementioned organic luminous layer from a poly alkyl fluorene.
[Procedure amendment 2]
[Document to be Amended] Specification
[Item(s) to be Amended] 0009
[Method of Amendment] Change
[Proposed Amendment]
[0009]
[Means for Solving the Problem] The manufacture method of the active matrix type organic EL display object in connection with this invention A hole-injection layer is formed in the transparent pixel electrode upper layer formed in the glass substrate which has TFT. The organic luminous layer (organic luminous layer which consisted of luminescent material which consists especially of polymer or its precursor) which has the luminescent color besides chosen as the layer from red, green, and blue for every pixel at least is formed. Furthermore, in the manufacture method of an active matrix type organic EL display object that a reflector is formed in this upper layer, it is characterized by making formation and the array of the aforementioned organic luminous layer by the ink-jet method. Moreover, in the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from red, green, and blue as the transparent pixel electrode upper layer formed in the glass substrate which has TFT for every pixel at least is formed, and a reflector is further formed in this upper layer, it is characterized by making formation and the

array of the aforementioned organic luminous layer by the ink-jet method.

---------- [Procedur revision]
[Filing Date] November 25, Heisei 11 (1999. 11.25)
[Procedure amendment 1]
[Document to be Amended] Specification
[Item(s) to be Amended] Claim
[Method of Amendment] Change
[Proposed Amendment]
[Claim(s)]
[Claim 1] A hole-injection layer is formed in the transparent pixel electrode upper layer formed in the glass substrate which has TFT. In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color besides chosen as the layer from red, green, and blue for every pixel at least is formed, and a reflector is further formed in this upper layer The manufacture method of the active matrix type organic EL display object characterized by forming the aforementioned organic luminous layer with an ink-jet method so that the configuration and array may serve as the last pattern.
[Claim 2] In the transparent pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, and a reflector is further formed in this upper layer The manufacture method of the active matrix type organic EL display object characterized by forming the aforementioned organic luminous layer with an ink-jet method so that the configuration and array may serve as the last pattern.
[Claim 3] In the reflective pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, a hole-injection layer is formed in this upper layer, and a transparent electrode is further formed in this upper layer The manufacture method of the active matrix type organic EL display object characterized by forming the aforementioned organic luminous layer with an ink-jet method so that the configuration and array may serve as the last pattern.
[Claim 4] In the reflective pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, and a transparent electrode is further formed in this upper layer The manufacture method of the active matrix type organic EL display object characterized by forming the aforementioned organic luminous layer with an ink-jet method so that the configuration and array may serve as the last pattern.
[Claim 5] The manufacture method of the active matrix type organic EL display object according to claim 1 to 4 which supplies polymer or its precursor by the aforementioned ink-jet method, and forms the aforementioned organic luminous layer.
[Claim 6] The manufacture method of the active matrix type organic EL display object according to claim 1 to 5 which forms the aforementioned organic luminous layer which has the red luminescent color by the cyano polyphenylene vinylene.
[Claim 7] The manufacture method of the active matrix type organic EL display object according to claim 1 to 6 which forms the aforementioned organic luminous layer which has the green luminescent color by the polyphenylene vinylene.
[Claim 8] The manufacture method of the active matrix type organic EL display object according to claim 1 to 7 which forms the aforementioned organic luminous layer which has the blue luminescent color by the polyphenylene vinylene and the poly alkyl phenylene.
[Claim 9] The manufacture method of the active matrix type organic EL display object according

to claim 1 to 8 which constitutes the aforementioned organic luminous layer from a poly alkyl fluorene.

[Procedure amendment 2]

[Document to be Amended] Specification

[Item(s) to be Amended] 0009

[Method of Amendment] Change

[Proposed Amendment]

[0009]

[Means for Solving the Problem] The manufacture method of the active matrix type organic EL display object in connection with this invention A hole-injection layer is formed in the transparent pixel electrode upper layer formed in the glass substrate which has TFT. The organic luminous layer (organic luminous layer which consisted of luminescent material which consists especially of polymer or its precursor) which has the luminescent color besides chosen as the layer from red, green, and blue for every pixel at least is formed. Furthermore, in the manufacture method of an active matrix type organic EL display object that a reflector is formed in this upper layer, it is characterized by forming the aforementioned organic luminous layer with an ink-jet method so that the configuration and array may serve as the last pattern. Moreover, in the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from red, green, and blue as the transparent pixel electrode upper layer formed in the glass substrate which has TFT for every pixel at least is formed, and a reflector is further formed in this upper layer, it is characterized by forming the aforementioned organic luminous layer with an ink-jet method so that the configuration and array may serve as the last pattern.

[Procedure amendment 3]

[Document to be Amended] Specification

[Item(s) to be Amended] 0010

[Method of Amendment] Change

[Proposed Amendment]

[0010] In the reflective pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Furthermore, red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, a hole-injection layer is formed in this upper layer, and a transparent electrode is further formed in this upper layer It is characterized by forming the aforementioned organic luminous layer with an ink-jet method so that the configuration and array may serve as the last pattern. In the reflective pixel electrode upper layer formed in the glass substrate which has TFT, for every pixel at least Moreover, red, In the manufacture method of an active matrix type organic EL display object that the organic luminous layer which has the luminescent color chosen from green and blue is formed, and a transparent electrode is further formed in this upper layer It is characterized by forming the aforementioned organic luminous layer with an ink-jet method so that the configuration and array may serve as the last pattern.

[Translation done.]

(19)日本国特許庁（ＪＰ）　(12)公開特許公報(A)　(11)..許出願公開番号
特開平10－12377
(43)公開日　平成10年(1998)１月16日

(51)Int.Cl.⁶	識別記号	庁内整理番号	FI	技術表示箇所
H05B 33/10			H05B 33/10	
B41J 2/01			B41J 3/04	101Z

審査請求　未請求　請求項の数4　OL　（全５頁）

(21)出願番号　特願平8－158671

(22)出願日　平成８年(1996)６月19日

(71)出願人　000002369
セイコーエプソン株式会社
東京都新宿区西新宿２丁目４番１号

(72)発明者　下田　達也
長野県諏訪市大和３丁目３番５号　セイコーエプソン株式会社内

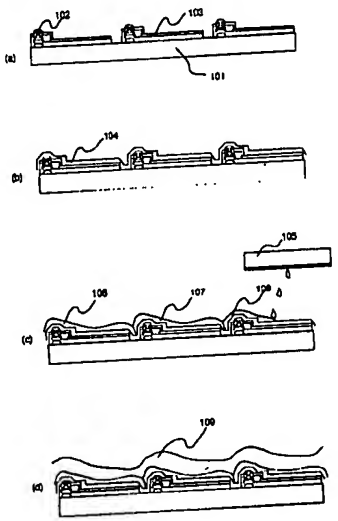
(72)発明者　宮下　悟
長野県諏訪市大和３丁目３番５号　セイコーエプソン株式会社内

(72)発明者　木口　浩史
長野県諏訪市大和３丁目３番５号　セイコーエプソン株式会社内

(74)代理人　弁理士　鈴木　喜三郎　(外１名)

(54)【発明の名称】　アクティブマトリックス型有機ＥＬ表示体の製造方法

(57)【要約】
【解決手段】従来、パターニングができないとされた有機ＥＬ材料をインクジェット方式により形成および配列することで、赤、緑、青の発光色を備える有機発光層を画素毎に任意にパターニングすることが可能となった。これにより、フルカラー表示のアクティブマトリックス型有機ＥＬ表示体を実現した。
【効果】安価で大画面のフルカラー表示体が製造可能となり、効果は大である。



【特許請求の範囲】
【請求項１】　薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に正孔注入層が形成され、この上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とするアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項２】　薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とするアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項３】　薄膜トランジスタを有するガラス基板に形成された反射画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、この上層に正孔注入層が形成され、更にこの上層に透明電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とするアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項４】　薄膜トランジスタを有するガラス基板に形成された反射画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に透明電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とするアクティブマトリックス型有機ＥＬ表示体の製造方法。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、薄膜トランジスタを用いたアクティブマトリックス型のＥＬ表示体のインクジェット方式を用いた製造方法に関する。
【０００２】
【従来の技術】有機ＥＬ素子は、蛍光性有機化合物を含む薄膜を、陰極と陽極とで挟んだ構成を有し、前記薄膜に電子および正孔（ホール）を注入して再結合させることにより励起子（エキシトン）を生成させ、このエキシトンが失活する際の光の放出（蛍光・燐光）を利用して発光させる素子である。
【０００３】この有機ＥＬ素子の特徴は、１０Ｖ以下の低電圧で１００～１００００ cd/m2　程度の高輝度の面発光が可能であり、また蛍光物質の種類を選択することにより青色から赤色までの発光が可能なことである。
【０００４】有機ＥＬ素子は、安価な大面積フルカラー表示素子を実現するものとして注目を集めている（電子情報通信学会技術報告、第８９巻、NO．１０６，４９ページ、１９８９年）。報告によると、強い蛍光を発する有機色素を発光層に使用し、青、緑、赤色の明るい発光を得ている。これは、薄膜状で強い蛍光を発し、ピンホール欠陥の少ない有機色素を用いたことで、高輝度なフルカラー表示を実現できたと考えられている。
【０００５】更に特開平５－７８６５５号公報には、有機発光層の成分が有機電荷材料と有機発光材料の混合物からなる薄膜層を設け、濃度消光を防止して発光材料の選択幅を広げ、高輝度なフルカラー素子とする旨が提案されている。
【０００６】しかし、いずれの報告にも、実際のフルカラー表示パネルの構成や製造方法については言及されていない。
【０００７】
【発明が解決しようとする課題】前述の有機色素を用いた有機薄膜ＥＬ素子は、青、緑、赤の発光を示す。しかし、よく知られているように、フルカラー表示体を実現するためには、３原色を発光する有機発光層を画素毎に配置する必要がある。従来、有機発光層をパターニングする技術は非常に困難とされていた。原因は、一つは反射電極材の金属表面が不安定であり、蒸着のパターニング精度が出ないという点である。２つめは、正孔注入層および有機発光層を形成するポリマーや前駆体がフォトリソグラフィー等のパターニング工程に対して耐性が無いという点である。
【０００８】本発明は、上述したような課題を解決するものであり、その目的は、有機発光層をインクジェット方式により画素毎にパターニングしたアクティブマトリックス型ＥＬ表示体の製造方法を提供することにある。
【０００９】
【課題を解決するための手段】本発明に関わるアクティブマトリックス型有機ＥＬ表示体の製造方法は、薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に正孔注入層が形成され、この上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とし、また、薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とする。

【００１０】更に、薄膜トランジスタを有するガラス基板に形成された反射画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、この上層に正孔注入層が形成され、更にこの上層に透明電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とし、また、薄膜トランジスタを有するガラス基板に形成された反射画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に透明電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とする。

【００１１】本発明は、要するに図３に示すように、基板上に形成された信号線３０１、ゲート線３０２、画素電極３０３および薄膜トランジスタ３０４上に、インクジェット法により、赤、緑、青色の有機発光材料をパターニング塗布することで、フルカラー表示を実現するものである。

【００１２】

【発明の実施の形態】以下、本発明の好適な実施形態について図面を参照して説明する。

【００１３】（実施例１）図１に示すように、ガラス基板１０１上に薄膜トランジスタ１０２を形成してから、ＩＴＯ透明画素電極１０３を形成する。

【００１４】正孔注入材料としてポリマー前駆体であるポリテトラヒドロチオフェニルフェニレンをコーティングする。加熱により、前駆体はポリフェニレンビニレンとなり、厚さ０．０５ミクロンの正孔注入層１０４が形成される。

【００１５】次に、インクジェットプリント装置１０５により赤、緑、青色を発色する発光材料をパターニング塗布し、厚さ０．０５ミクロンの発色層１０６、１０７、１０８を形成する。赤色発光材料にはシアノポリフェニレンビニレン、緑色発光材料にはポリフェニレンビニレン、青色発光材料にはポリフェニレンビニレンおよびポリアルキルフェニレンを使用する。これらの有機ＥＬ材料はケンブリッジ・ディスプレイ・テクノロジー社製であり、液状で入手可能である。

【００１６】最後に、厚さ０．１～０．２ミクロンのＭｇＡｇ反射電極１０９を蒸着法により形成する。

【００１７】これにより、直視型のフルカラー有機ＥＬ表示体が完成する。

【００１８】（実施例２）図２に示すように、ガラス基板２０１上に薄膜トランジスタ２０２を形成してから、ＡｌＬｉ反射画素電極２０３を形成する。

【００１９】次に、インクジェットプリント装置２０７により赤、緑、青色を発色する発光材料をパターニング塗布し、発色層２０４、２０５、２０６を形成する。赤色発光材料にはシアノポリフェニレンビニレン、緑色発光材料にはポリフェニレンビニレン、青色発光材料にはポリフェニレンビニレンおよびポリアルキルフェニレンを使用する。これらの有機ＥＬ材料はケンブリッジ・ディスプレイ・テクノロジー社製であり、液状で入手可能である。

【００２０】正孔注入材料としてポリマー前駆体であるポリテトラヒドロチオフェニルフェニレンをキャスト法により形成する。加熱により、前駆体はポリフェニレンビニレンとなり、正孔注入層２０８が形成される。

【００２１】最後に、ＩＴＯ透明電極２０９を蒸着法により形成する。

【００２２】これにより、反射型のフルカラー有機ＥＬ表示体が完成する。

【００２３】（実施例３）有機発光層の有機発光材料として2,3,6,7-テトラヒドロ-11-オキソ-1H,5H,11H-(1)ベンゾピラノ[6,7,8-ij]-キノリジン-10-カルボン酸を用い、有機正孔注入層材料として1,1-ビス-(4-N,N-ジトリルアミノフェニル)シクロヘキサンを用い、両者を混合することで緑色の発光材料とする。

【００２４】同様に、赤色の有機発光材料として、2-(3',4'-ジヒドロキシフェニル)-3,5,7-トリヒドロキシ-1-ベンゾピリリウムパークロレートを用いて正孔注入層材料と混合する。

【００２５】更に、青色発光層には有機正孔注入材料としてトリス(8-ヒドロキシキノリノール)アルミニウムを用い、有機発光材料として、2,3,6,7-テトラヒドロ-9-メチル-11-オキソ-1H,5H,11H-(1)ベンゾピラノ[6,7,8-ij]-キノリジンを混合し、発光材料を作成する。

【００２６】実施例１または実施例２と同様な工程で、各々の発光層をインクジェットプリンタ装置により局所パターニングし、アクティブマトリックス型有機ＥＬ表示体を作成する。

【００２７】なお、本実施例で使用した有機ＥＬ材料以外にも、アロマティックジアミン誘導体（ＴＤＰ）、オキシジアゾールダイマー（ＯＸＤ）、オキシジアゾール誘導体（ＰＢＤ）、ジスチルアリーレン誘導体（ＤＳＡ）、キノリノール系金属錯体、ベリリウムーベンゾキノリノール錯体（Ｂｅｂｑ）、トリフェニルアミン誘導体（ＭＴＤＡＴＡ）、ジスチリル誘導体、ピラゾリンダイマー、ルブレン、キナクリドン、トリアゾール誘導体、ポリフェニレン、ポリアルキルフルオレン、ポリアルキルチオフェン、アゾメチン亜鉛錯体、ポリフィリン亜鉛錯体、ベンゾオキサゾール亜鉛錯体、フェナントロリンユウロピウム錯体が使用できるが、これに限られる物ではない。

【００２８】

【発明の効果】従来、パターニングができないとされた有機ＥＬ材料をインクジェット方式により形成および配列することでパターニングが可能となり、フルカラー表示のアクティブマトリックス型有機ＥＬ表示体を実現した。これにより、安価で大画面のフルカラー表示体が製造可能となり、効果は大である。

【図面の簡単な説明】

【図１】本発明の第１の実施形態におけるアクティブマトリックス型有機ＥＬ表示体の工程を示す図である。

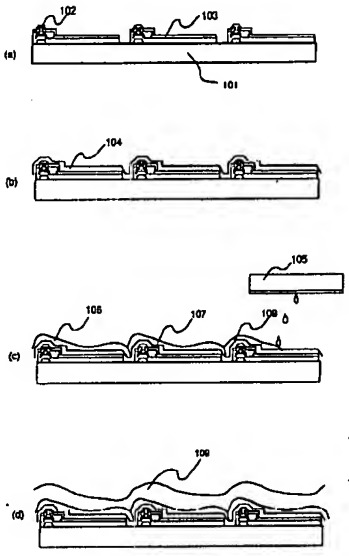
【図２】本発明の第２の実施形態におけるアクティブマトリックス型有機ＥＬ表示体の工程を示す図である。

【図３】本発明の薄膜トランジスタ上にインクジェット法により形成された発色層を示す図である。

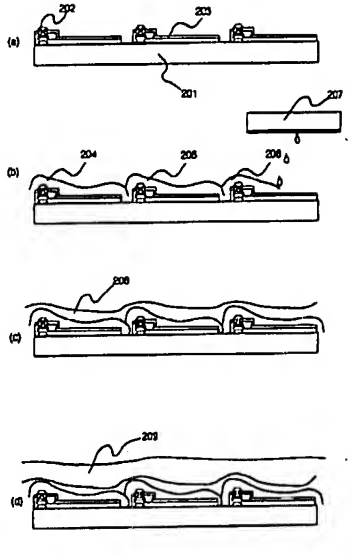
【符号の説明】

１０１　ガラス基板
１０２　薄膜トランジスタ
１０３　透明画素電極
１０４　正孔注入層
１０５　インクジェットプリンタヘッド
１０６　有機発光層（第１色）
１０７　有機発光層（第２色）
１０８　有機発光層（第３色）
１０９　反射電極
２０１　ガラス基板
２０２　薄膜トランジスタ
２０３　反射画素電極
２０４　有機発光層（第１色）
２０５　有機発光層（第２色）
２０６　有機発光層（第３色）
２０７　インクジェットプリンタヘッド
２０８　正孔注入層
２０９　透明電極
３０１　信号線
３０２　ゲート線
３０３　画素電極
３０４　薄膜トランジスタ
３０５　有機発光層（第１色）
３０６　有機発光層（第２色）
３０７　有機発光層（第３色）

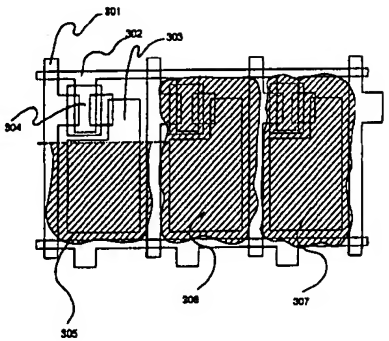
【図１】



【図２】



【図３】



【公報種別】特許法第１７条の２の規定による補正の掲載
【部門区分】第７部門第１区分
【発行日】平成１３年３月１６日（２００１．３．１６）

【公開番号】特開平１０－１２３７７
【公開日】平成１０年１月１６日（１９９８．１．１６）
【年通号数】公開特許公報１０－１２４
【出願番号】特願平８－１５８６７１
【国際特許分類第７版】
H05B 33/10
B41J 2/01
【ＦＩ】
H05B 33/10
B41J 3/04 101 Z

【手続補正書】
【提出日】平成１１年１０月２９日（１９９９．１０．２９）
【手続補正１】
【補正対象書類名】明細
【補正対象項目名】特許請求の範囲
【補正方法】変更
【補正内容】
【特許請求の範囲】
【請求項１】　薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に正孔注入層が形成され、この上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とするアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項２】　薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とするアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項３】　薄膜トランジスタを有するガラス基板に形成された反射画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、この上層に正孔注入層が形成され、更にこの上層に透明電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とするアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項４】　薄膜トランジスタを有するガラス基板に形成された反射画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に透明電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とするアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項５】　前記インクジェット方式でポリマーまたはその前駆体を供給して、前記有機発光層を形成する請求項１ないし４のいずれかに記載のアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項６】　シアノポリフェニレンビニレンにより、赤色の発光色を有する前記有機発光層を形成する請求項１ないし５のいずれかに記載のアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項７】　ポリフェニレンビニレンにより、緑色の発光色を有する前記有機発光層を形成する請求項１ないし６のいずれかに記載のアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項８】　ポリフェニレンビニレンおよびポリアルキルフェニレンにより、青色の発光色を有する前記有機発光層を形成する請求項１ないし７のいずれかに記載のアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項９】　前記有機発光層をポリアルキルフルオレンで構成する請求項１ないし８のいずれかに記載のアクティブマトリックス型有機ＥＬ表示体の製造方法。
【手続補正２】
【補正対象書類名】明細書
【補正対象項目名】０００９
【補正方法】変更
【補正内容】
【０００９】
【課題を解決するための手段】本発明に関わるアクティブマトリックス型有機ＥＬ表示体の製造方法は、薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に正孔注入層が形成され、この上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層（特にポリマーまたはその前駆体よりなる発光材料で構成された有機発光層）が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とする。また、薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とする。

【手続補正書】
【提出日】平成１１年１１月２５日（１９９９．１１．２５）
【手続補正１】
【補正対象書類名】明細書
【補正対象項目名】特許請求の範囲
【補正方法】変更
【補正内容】
【特許請求の範囲】
【請求項１】　薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に正孔注入層が形成され、この上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層をその形状および配列が最終パターンとなるようインクジェット方式により形成することを特徴とするアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項２】　薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層をその形状および配列が最終パターンとなるようインクジェット方式により形成することを特徴とするアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項３】　薄膜トランジスタを有するガラス基板に形成された反射画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、この上層に正孔注入層が形成され、更にこの上層に透明電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層をその形状および配列が最終パターンとなるようインクジェット方式により形成することを特徴とするアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項４】　薄膜トランジスタを有するガラス基板に形成された反射画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に透明電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とする。また、薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層の形成および配列がインクジェット方式によりなされることを特徴とする。
【請求項５】　前記インクジェット方式でポリマーまたはその前駆体を供給して、前記有機発光層を形成する請求項１ないし４のいずれかに記載のアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項６】　シアノポリフェニレンビニレンにより、赤色の発光色を有する前記有機発光層を形成する請求項１ないし５のいずれかに記載のアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項７】　ポリフェニレンビニレンにより、緑色の発光色を有する前記有機発光層を形成する請求項１ないし６のいずれかに記載のアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項８】　ポリフェニレンビニレンおよびポリアルキルフェニレンにより、青色の発光色を有する前記有機発光層を形成する請求項１ないし７のいずれかに記載のアクティブマトリックス型有機ＥＬ表示体の製造方法。
【請求項９】　前記有機発光層をポリアルキルフルオレンで構成する請求項１ないし８のいずれかに記載のアクティブマトリックス型有機ＥＬ表示体の製造方法。
【手続補正２】
【補正対象書類名】明細書
【補正対象項目名】０００９
【補正方法】変更
【補正内容】
【０００９】
【課題を解決するための手段】本発明に関わるアクティブマトリックス型有機ＥＬ表示体の製造方法は、薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に正孔注入層が形成され、この上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層（特にポリマーまたはその前駆体よりなる発光材料で構成された有機発光層）が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層をそ

の形状および配列が最終パターンとなるようインクジェット方式により形成することを特徴とする。また、薄膜トランジスタを有するガラス基板に形成された透明画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に反射電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層をその形状および配列が最終パターンとなるようインクジェット方式により形成することを特徴とする。

【手続補正３】
【補正対象書類名】明細書
【補正対象項目名】００１０
【補正方法】変更
【補正内容】
【００１０】更に、薄膜トランジスタを有するガラス基板に形成された反射画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、この上層に正孔注入層が形成され、更にこの上層に透明電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層をその形状および配列が最終パターンとなるようインクジェット方式により形成することを特徴とし、また、薄膜トランジスタを有するガラス基板に形成された反射画素電極上層に少なくとも各画素毎に赤、緑、青より選択された発光色を有する有機発光層が形成され、更にこの上層に透明電極が形成されるアクティブマトリックス型有機ＥＬ表示体の製造方法において、前記有機発光層をその形状および配列が最終パターンとなるようインクジェット方式により形成することを特徴とする。